WHAT IS CLAIMED IS:

1. A method for transmitting data over an optical network, comprising the steps of:

transmitting a first protocol data unit (PDU) to an ingress labeled optical burst switching (LOBS) node, said ingress LOBS node having a Burst Assembly unit and a control packet processing unit, and is connected to at least one other LOBS node,

passing said first PDU, including its label, if any, to said Burst Assembly unit, said first PDU containing the addressing information egress LOBS node,

optionally passing at least one additional PDU going to the same egress LOBS node as the first PDU to said Burst Assembly unit,

continuing to pass additional PDUs going to the same egress LOBS node as prior PDUs to said Burst Assembly unit until a pre-set threshold is met,

said Burst Assembly unit assembling an optical burst from the PDUs passed to it,

said control packet processing unit of the ingress LOBS node constructing a labeled optical burst switching control packet,

sending the labeled optical burst switching control packet on a designated control wavelength to a second LOBS node, said second LOBS node either being a node intermediate to the egress LOBS node or the egress LOBS node,

performing optical signal to electrical signal conversion on the labeled optical burst switching control packet at said node intermediate to the egress LOBS node in order to set up a path using a data wavelength from the ingress LOBS node to the egress LOBS node, or at the egress node in order to drop the burst at the burst dis-assembly unit,

sending the optical data burst to the egress node along the pre-set path on a data wavelength in an optical burst switched mode without converting the optical data burst to an electrical signal at intermediate LOBS nodes, and without requiring burst delay devices such as FDLs and without requiring wavelength conversion devices.

the egress LOBS node receiving the optical data burst, said egress node having a burst dis-assembly unit,

passing the optical data burst to said burst dis-assembly unit, and

the burst dis-assembly unit converting the optical data burst to PDUs.

2. A network for the transmission of data, comprising:

means for transmitting a first protocol data unit (PDU) to an ingress labeled optical burst switching (LOBS) node, said ingress LOBS node having a Burst Assembly unit and a control packet processing unit, and is connected to at least one other LOBS node,

means for passing said first PDU, including its label, if any, to said Burst Assembly unit of said first PDU containing addressing information egress LOBS node,

means for optionally passing at least one additional PDU going to the same egress LOBS node as the first PDU to said Burst Assembly unit,

means for continuing to pass additional PDUs going to the same egress LOBS node as prior PDUs to said Burst Assembly unit until a pre-set threshold is met,

means for said Burst Assembly unit assembling an optical burst from the PDUs passed to it,

means for said control packet processing unit of the ingress LOBS node constructing a labeled optical burst switching control packet,

means for sending the labeled optical burst switching control packet on a designated control wavelength to a second LOBS node, said LOBS node either being a LOBS node intermediate to the egress LOBS node or the egress LOBS node,

means for performing optical signal to electrical signal conversion on the labeled optical burst switching control packet at said LOBS node intermediate to the egress LOBS node in order to set up a path using a data wavelength from the ingress LOBS node to the egress LOBS node, or at the egress node in order to drop the burst at the burst dis-assembly unit,

means for sending the optical data burst to the egress node along the pre-set path on a data wavelength in an optical burst switched mode without converting the optical data burst to an electrical signal at intermediate LOBS nodes, and without requiring burst delay devices such as FDLs and without requiring wavelength conversion devices,

means for the egress LOBS node receiving the optical data burst, said egress node having a burst dis-assembly unit,

means for passing the optical data burst to said burst dis-assembly unit, and

means for the burst dis-assembly unit converting the optical data burst to PDUs.

3. A network according to claim 2, in which the intermediate Labeled Optical Burst Switching Node comprises:

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface; and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

4. A network according to Claim 2, in which the ingress Labeled Optical Burst Switching Node comprises:

an Access Point interface connecting the ingress Labeled Optical Burst Switching Node to PDU devices such as electronic label switching routers,

a Burst assembly unit,

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface; and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

5. A network according to Claim 2, in which the egress Labeled Optical Burst Switching Node comprises:

an Access Point interface connecting the Labeled Optical Burst Switching Node to PDU devices such as electronic label switching routers,

a Burst dis-assembly unit,

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface; and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

6. A Labeled Optical Burst Switching Node for network communications comprising:

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface; and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

7. A Labeled Optical Burst Switching Node for network communications according to claim 6, further comprising:

an Access Point interface connecting the Labeled Optical Burst Switching Node to PDU devices such as electronic label switching routers,

a Burst assembly unit,

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface, and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

8. A Labeled Optical Burst Switching Node for network communications according to claim 6, further comprising:

an Access Point interface connecting the Labeled Optical Burst Switching Node to PDU devices such as electronic label switching routers,

a Burst dis-assembly unit,

a Wavelength-Division Multiplexed Optical Burst Switch comprising an Optical Burst Switching Fabric and its controller, an input interface and an output interface, and

a control packet processing unit connected to the Wavelength-Division Multiplexed Optical Burst Switch, said processing unit utilizing as the control platform Multi-Protocol Label Switching in conjunction with LOBS specific extensions.

9. An optical network comprised of at least one Labeled Optical Burst Switching Nodes according to Claim 7 and at least one LOBS node according to claim 8.

10. A method for transmitting data over an optical network according to claim 1, in which the optical burst switching control packet, comprises a field for Label as defined in the Multi-Protocol Label Switching protocol, at least one other field as defined in said protocol, and at least one LOBS specific field selected from the group consisting of Burst length, basic offset time, extra offset time, control packet arrival time, control packet departure time, error detecting/correcting code, ingress LOBS node address and egress LOBS node address.

11. A network for the transmission of data according to Claim 2, in which protocol data units or data packets from PDU devices such as electronic label switching routers are assembled into optical bursts at an ingress LOBS node, and then delivered, in an optical burst switched mode, to an egress LOBS node, without going through an Optical/Electrical/Optical conversion at intermediate LOBS nodes.

12. A network for the transmission of data according to claim 2, in which packets going to the same egress Labeled Optical Burst Switching node are assembled into at least one burst according to the packet's Class of Service.

13. A network for the transmission of data according to claim 2, in which for one or more Classes of Service, the assembly time of a burst is limited according to the minimum value of the maximum delay budget of the packets assembled in the burst.

14. A network for the transmission of data according to claim 2, in which for one or more Classes of Service, the assembly of a burst is completed once the length of the burst as measured in bits, bytes or transmission time, exceeds a threshold.

15. A network for the transmission of data according to claim 2, in which burst profile information is distributed pertaining to each link in a Labeled Optical Burst Switched Network to establish one or more LOBS paths according to the distributed burst profile information.

16. A network for the transmission of data according to claim 2, wherein at least one backup LOBS path for at least one primary path is established, and at least one copy of at least one lost data burst or portion thereof is sent via at least one such backup LOBS path.

17. A network for the transmission of data according to claim 2, in which a method for the detection and localization of faults in LOBS networks comprising electronic monitoring on designated LOBS control channels is implemented.